

AMENDMENT TO CLAIMS

This list of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims

1. (Original). A method to stabilize high aspect ratio, post-etch lithographic feature against collapse, the method comprising the steps of:
- (a) coating a substrate with a substantially organic underlayer;
 - (b) coating said underlayer with a photoresist comprising materials that form a stable, etch-resistant, non-volatile oxide;
 - (c) imagewise exposing said photoresist to radiation;
 - (d) developing an image in said photoresist;
 - (e) transferring said image through said underlayer into said substrate thus forming a high aspect ratio resist image; and
 - (f) treating said high aspect ratio resist image with a chemically-reducing plasma.
2. (Original). A method to stabilize high aspect ratio, post-etch lithographic feature against collapse, according to claim 1, wherein said photoresist comprises an element capable of forming a stable, etch-resistant, non-volatile oxide selected from the group consisting of silicon, phosphorous, germanium, aluminum, and boron.
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3. (Currently amended). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said ~~bilayer resist comprises~~ is a bilayer resist comprising:
- an organic underlayer formed on said substrate; and
 - a photoresist comprising materials that form a stable, etch-resistant, non-volatile oxide formed on said underlayer.
4. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein transferring said image comprises etching wherein said etching comprises passivating chemistry.

5. (Currently amended). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 34, wherein passivating chemistry comprises any process that generates hygroscopic moieties.
6. (Currently amended). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 34, wherein passivating chemistry comprises an SO₂ and O₂ containing plasma.
7. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said chemically-reducing plasma comprises hydrogen.
8. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said chemically-reducing plasma comprises a hydrogen-generating species.
9. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said underlayer comprises an organic material selected from the group consisting of tuned polymers, novolacs, and low-k dielectrics.
10. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said underlayer comprises an organic material essentially comprising carbon, hydrogen, and oxygen.
11. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said photoresist comprises a polymer having acid-cleavable moieties bound thereto.
12. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said photoresist comprises a polymer formed by polymerizing one or more monomers selected from the group consisting of acrylate,

methacrylate, hydroxystyrene optionally substituted with C₁₋₆-alkyl, C₅₋₂₀ cyclic olefin monomers, and combinations thereof, the polymer having acid-cleavable moieties bound thereto, wherein all such moieties are silylethoxy groups optionally substituted on the ethoxy portion thereof with C₁₋₆-alkyl, phenyl, or benzyl.

13. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said photoresist comprises a radiation-sensitive acid generator.

14. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said radiation comprises electromagnetic radiation or electron beam radiation.

15. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said radiation comprises ultraviolet radiation or extreme ultraviolet radiation.

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Cont.
16. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said radiation comprises x-ray radiation.

17. (Original). A method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein transferring said image further comprises forming a reduced critical dimension bilayer resist image.

18. (Withdrawn). The stabilized high aspect ratio, post-etch lithographic image formed according to claim 1.

19. (Withdrawn). The semiconductor device fabricated using the stabilized high aspect ratio image formed according to claim 1.

20. (Original). A method of fabricating semiconductor devices using a stabilized, high aspect ratio bilayer resist image comprising the steps of:

- (a) coating a substrate with an organic underlayer;
- (b) coating said underlayer with a photoresist comprising a material that form a stable, etch-resistant, non-volatile oxide;
- (c) imagewise exposing said photoresist to radiation;
- (d) developing an image in said photoresist;
- (e) transferring said image through said underlayer into said substrate thus forming a high aspect ratio resist image;
- (f) treating said high aspect ratio resist image with a chemically-reducing plasma;
- (g) transferring said image into said substrate forming a circuit image; and
- (h) forming circuit element materials in said circuit image.

21. (Original). A method of fabricating semiconductor devices using a stabilized, high aspect ratio bilayer resist image, according to claim 20, wherein said circuit element materials comprise materials selected from the group consisting of dielectric, conductor, semiconductor, and doped semiconductor materials.

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Cont. 22. (Withdrawn). The stabilized high aspect ratio, post-etch lithographic image formed according to claim 1, wherein said resist is a trilayer resist.

23. (Withdrawn). The stabilized high aspect ratio, post-etch lithographic image formed according to claim 22, wherein said trilayer resist comprises:

- an organic resist;
- an anti-reflective coating;
- an inorganic hard mask; and
- a thick organic layer.

24. (Withdrawn). The stabilized high aspect ratio, post-etch lithographic image formed according to claim 23, wherein said hard mask comprises silicon.

25. (Withdrawn). The semiconductor device fabricated using a reduced critical dimension bilayer resist image, according to claim 20.

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cont. 26. (Withdrawn). The semiconductor device fabricated using a stabilized high aspect ratio, post-etch lithographic image formed according to claim 23.
